Claims

What is claimed is:

1. A method for integrating the functions of at least two network services in an Open IP Services Platform that provides access to a network, said method comprising the steps of:

   1) providing a single board computer running an open architecture Operation System, at least two bus connectors coupled to the single board computer, and used for receiving cards that perform network functions, a switch/router board coupled to the single board computer, and a plurality of network ports coupled to the switch/router board; and

   2) configuring interconnections between the at least two bus connectors, the switch/router board, and the single board computer by utilizing configuration software that directs a plurality of switches to make physical interconnections within the Open IP Services Platform.

2. The method as defined in claim 1 wherein the method further comprises the step of enabling the Open IP Services Platform to determine a desirable network

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topology within the Open IP Services Platform for the at least two network functions being performed.

3.   The method as defined in claim 2 wherein the method
5   further comprises the step of enabling an administrator to utilize the configuration software to configure individual ports of the Open IP Services Platform.

4.   The method as defined in claim 3 wherein the
10   configuration software is able to configure the individual ports of the Open IP Services Platform by selecting a configuration scheme from the group of configuration schemes comprising bandwidth usage, rule sets, trigger points, IP services being performed, and protocol usage.
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5.   The method as defined in claim 4 wherein the configuration software enables on the fly configuration of the Open IP Services Platform, wherein the Open IP Services Platform is not rebooted in order to effect
20   desired changes in interconnections.

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6.   The method as defined in claim 5 wherein the method further comprises the step of enabling a plurality of different network devices to be coupled to the at least two bus connectors, wherein the plurality of different network devices are selected from the group of network devices comprising routers, switches, load balancers, bridges, firewalls, packet shapers, and servers.

7.   The method as defined in claim 6 wherein the method further comprises the step of enabling network devices from any vendor to be included in the Open IP Services Platform, wherein memory management prevents any one of the network devices from interfering with operation of any other network device.

8.   The method as defined in claim 7 wherein the method further comprises the step of enabling any vendor of the network devices to provide a software module that is utilized by the configuration software to represent and control operation of a network device.

9.   The method as defined in claim 8 wherein the method

further comprises the step of providing the Operating

System that includes all components of a complete version,

thereby including all security and memory management

5   features.

10. The method as defined in claim 9 wherein the method

further comprises the step of modifying or making

additions to the Operating System in order to enable a

10   network device to operate within the Open IP Services

Platform.

11. The method as defined in claim 10 wherein the method

further comprises the step of reducing the time required

15   to configure the network topology, wherein the

configuration software provides a graphical user interface

that enables an administrator to drag and drop icons

representing the network devices into the desired network

topology.

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12. The method as defined in claim 11 wherein the method

further comprises the steps of:

1) providing a plurality of pre-configured network topologies that are stored in memory;

2) selecting of the pre-configured network topologies; and

5   3) instruction the Open IP Services Platform to implement the network topology defined in the pre-configured network topology utilizing network devices installed in the Open IP Services Platform.

10   13. The method as defined in claim 11 wherein the method further comprises the step of reducing networking knowledge requirements of the administrator, to thereby facilitate rapid and easy deployment of the network topology.

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14. The method as defined in claim 13 wherein the method further comprises the step of enabling operation of the Open IP Services Platform in harsh environments that would otherwise preclude operation of the Open IP Services

20   Platform by providing localized cooling for specific temperature sensitive components.

15. A method for providing an Open IP Services Platform that is capable of performing various network functions according to the specific network components that are disposed therein, and according to a network topology

5   selected for those network components, said method comprising the steps of:

1) providing a single board computer running an open architecture Operation System, at least two bus connectors coupled to the single board computer, and used for

10   receiving cards that perform network functions, a switch/router board coupled to the single board computer, and a plurality of network ports coupled to the switch/router board;

2) coupling a first set of network devices to the at

15   least two connector buses; and

3) configuring interconnections between the first set of network devices, the switch/router board, and the single board computer to thereby define a first network function and a first network topology for the Open IP

20   Services Platform.

16. The method as defined in claim 15 wherein the method further comprises the steps of reconfiguring through configuration software the interconnections between the first set of network devices, the switch/router board, and

5   the single board computer to thereby define a second network function and a second network topology for the Open IP Services Platform, without having to change the first set of network devices.

10 17. The method as defined in claim 16 wherein the method further comprises the steps of:

        1) removing the first set of network devices from the Open IP Services Platform;

        2) coupling a second set of network devices to the at

15 least two connector buses; and

        3) configuring interconnections between the second set of network devices, the switch/router board, and the single board computer to thereby define a third network function and a third network topology for the Open IP

20 Services Platform.

18. A method for integrating the functions of a plurality
of network devices into a single Open IP Services Platform
that provides access to a network, to thereby reduce space
requirements and the number of wires used to interconnect
5   network devices, said method comprising the steps of:

1) providing a single board computer running an open
architecture Operation System, at least two bus connectors
coupled to the single board computer, and used for
receiving cards that perform network functions, a
10   switch/router board coupled to the single board computer,
and a plurality of network ports coupled to the
switch/router board;

2) coupling a network device to one of the at least
two bus connectors, and

15   3) configuring interconnections between the network
device, the switch/router board, and the single board
computer by utilizing configuration software that directs
a plurality of switches to make physical interconnections
within the Open IP Services Platform, thereby eliminating
20   external wires normally used to interconnect the network
device and the switch/router board.

19. A system including an Open Internet Protocol (IP)

services platform for integrating the functions of at

least two network services in a single unit that does not

require external wires to couple the at least two network

5   services together, said system comprising:

a single board computer (SBC), including memory;

an open architecture Operating System (OS) stored in

the memory;

at least two bus connectors for receiving cards that

10   perform network functions, wherein the at least two bus

connectors are coupled to the SBC;

a switch/router board coupled to the single board

computer;

a plurality of network ports, wherein the plurality

15   of network ports are coupled on a first side to the

switch/router board, and provide a connection to a network

on a second side thereof; and

configuration software for controlling

interconnections between the at least two bus connectors,

20   the switch/router board, and the SBC.

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20. The system as defined in claim 19 wherein the open architecture Operating System is selected from the group of Operating Systems comprised of FreeBSD and Linux.

5   21. The system as defined in claim 20 wherein the at least two bus connectors further comprise peripheral component interconnect (PCI) bus connectors.

22. The system as defined in claim 21 wherein the
10   switch/router board is further comprised of:

a PCI to PCI bus bridge;

a PCI to PCMCIA bus bridge;

at least one random access memory module; and

a media switch for performing switch and router
15   function.

23. The system as defined in claim 22 wherein the plurality of network ports further comprises:

at least two gigabit ethernet ports;
20   at least twelve 10/100 ethernet ports; and

at least two PCMCIA type 2 expansion ports.

24. The system as defined in claim 23 wherein the plurality of network ports further comprises at least one universal serial bus (USB) port.

5   25. The system as defined in claim 24 wherein the at least two PCI bus connectors are coupled to network card performing network functions, wherein the network functions are selected from the group of network functions comprising routers, switches, load balancers, bridges,

10   firewalls, packet shapers, and servers.

26. The system as defined in claim 25 wherein the SBC further comprises a microprocessor that is selected from the group of microprocessors comprised of general purpose

15   microprocessors and special purpose microprocessors.

27. The system as defined in claim 26 wherein the configuration software further comprises a software utility that enables drag-and-drop configuration of

20   network components, to thereby simplify configuration of network components within the Open IP Services Platform.

28. The system as defined in claim 27 wherein the

configuration software utilizes icons that are

representative of the network components, wherein the

icons are ActiveX modules that define the functions that

5   are performed by the network components.

29. The system as defined in claim 28 wherein the

switch/router board is a level 4 network device that is

capable of communicating with other Open IP Services

10   Platforms at wire speed.

30. The system as defined in claim 29 wherein the system

further comprises a solid state refrigeration unit, where

the refrigeration unit is disposed directly on a case of a

15   hard drive, thereby directing cooling efforts directly on

the most temperature sensitive device within the Open IP

Services Platform.